Ch 6.3 Binomial Probability Distributions

Have to have the following criteria:

1. fixed number of trials
2. trials are independent
3. each trial must have all outcomes classified into 2 categories.
4. probability must remain constant.

Apr 25-8:41 AM

Determine if the examples represent a binomial probability distribution.

Ex1a) Rolling a die and keeping track of the number rolled?

Ex1b) Rolling a die and keeping track of the six's rolled?

Ex1c) Spinning a roulette wheel and keeping track of the winning number?

Ex1d) Keeping track of the number of girls born on Nov 19, 2014?

Nov 16-1:49 PM

How to find binomial probabilities

Step 1: State the distribution and the values of interest. Specify a binomial distribution with the number of trials *n*, success probability *p*, and the values of the variable clearly identified.

Step 2: Perform calculations—show your work! Do one of the following:

(i) Use the binomial probability formula to find the desired probability; or

(ii) use the binompdf or binomcdf command and label each of the inputs.

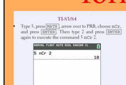
Step 3: Answer the question.

Nov 7-10:22 AM

Ex2a) 90% of the graduates at a State University apply to medical school are admitted. This year 6 applied. Find the p(that 4 will be accepted).

#ways it can happen x p(happens) x p(doesn't happen)

formula: $_nC_x \cdot p^x \cdot q^{n-x}$



$_6C_4$ x $.90^4$ x $.10^2$

.0984 about 10%

- Press 2nd VARS (DISTR) and choose binompdf (.
- **OS 2.55 or later:** In the dialog box, enter these values: trials:5, p:0.25, x value:3, choose Paste, and then press ENTER. **Older OS:** Complete the command binompdf(5,0.25,3) and press ENTER.

There are two handy commands on the TI-83/84 and TI-89 for finding binomial probabilities: binompdf and binomcdf. The inputs for both commands are the number of trials *n*, the success probability *p*, and the values of interest for the binomial random variable *X*.

binompdf(n,p,k) computes $P(X = k)$
binomcdf(n,p,k) computes $P(X \le k)$ cumulative probability function

Apr 25-8:50 AM

Ex2b) The probability a car parked out in front of its house on the street gets stolen is 1/120. What is the probability **1 gets stolen** if there are 5 cars on the street?

#ways it can happen x p(happens) x p(doesn't happen)

$_5C_1$ x $(1/120)^1$ x $(119/120)^4$

=.0403 about 4%

Ex 2c) P(none get stolen)

$_5C_0$ x $(1/120)^0$ x $(119/120)^5$

or $(119/120)^5$

= .9590 about 96%

Apr 25-10:56 AM

TRY:

Find the probability 8 out of 10 kids pass the exam if the probability of passing is 95%.

Nov 16-3:07 PM

Ex3b)In a shipment of 100 tires, there are 20 defects. What is the probability that if 5 are selected at random with each tire being replaced that ***at most 2 are defective***?

P(0) + P(1) +P(2) are defective

P(not defective) 80/100 = 4/5

$P(0) = {}_5C_0 \times (1/5)^0 \times (4/5)^5 =$

$P(1) = {}_5C_1 \times (1/5)^1 \times (4/5)^4 =$

$P(2) = {}_5C_2 \times (1/5)^2 \times (4/5)^3 =$ ________

Apr 25-11:49 AM

If I say that you need ***at least*** $20 to go on the field trip, write an inequality to represent how much money you need to bring?

If I say you can have ***no more*** than 3 friends over, write an inequality to represent how many friends you can have over?

What symbol represents at least?

What symbol represents no more?

Nov 16-2:17 PM

Ex3a) Your taking a multiple choice test with 5 questions each having 4 possible answers. If you guess on everyone, what is the probability you'll get ***at least 4 correct***)?

P(4 correct) or P(5 correct)
* add them for an or problem.

${}_5C_4 \times (1/4)^4 \times (3/4)^1 + {}_5C_5 \times (1/4)^5 \times (3/4)^0$

1/64

Apr 25-11:04 AM

Ex3c)In a shipment of 100 tires, there are 20 defects. What is the probability that if 5 are selected at random with each tire being replaced that ***at least 1 tire is defective***?

P(1) + P(2) + P(3) + P(4) + P(5)

$1 - (\text{no defects})^5$

$1-({}_5C_0 \times (1/5)^0 \times (4/5)^5)$

.67232

Apr 25-11:58 AM

Try#2. 60% of American victims of health care fraud are senior citizens. If ten victims of health care fraud are randomly selected, what is the probability that at least 8 of them are senior citizens?

Nov 16-3:17 PM

Try#3. 60% of American victims of health care fraud are senior citizens. If ten victims of health care fraud are randomly selected, what is the probability that at least 1 of them are senior citizens?

Nov 16-3:20 PM